

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
26 August 2004 (26.08.2004)

PCT

(10) International Publication Number
WO 2004/072383 A1

(51) International Patent Classification⁷: **E01H 1/08**,
A47L 9/32, B25G 1/06

(21) International Application Number:
PCT/SE2004/000157

(22) International Filing Date: 6 February 2004 (06.02.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0300389-4 12 February 2003 (12.02.2003) SE

(71) Applicant (for all designated States except US): **AK-TIEBOLAGET ELECTROLUX** [SE/SE]; S-105 45 Stockholm (SE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **NORINDER, Lotta** [SE/SE]; Tullportsgatan 2, S-554 22 Jönköping (SE). **JAKOBSSON, Anders** [SE/SE]; Lämmagården Bäckafall 2, S-544 93 Hjo (SE). **HÅKANSSON, Thomas** [SE/SE]; Svarvaregatan 31, S-561 31 Huskvarna (SE).

(74) Agent: **LILJEGREN, Fredrik**; AB Electrolux, Group Intellectual Property, S-105 45 Stockholm (SE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

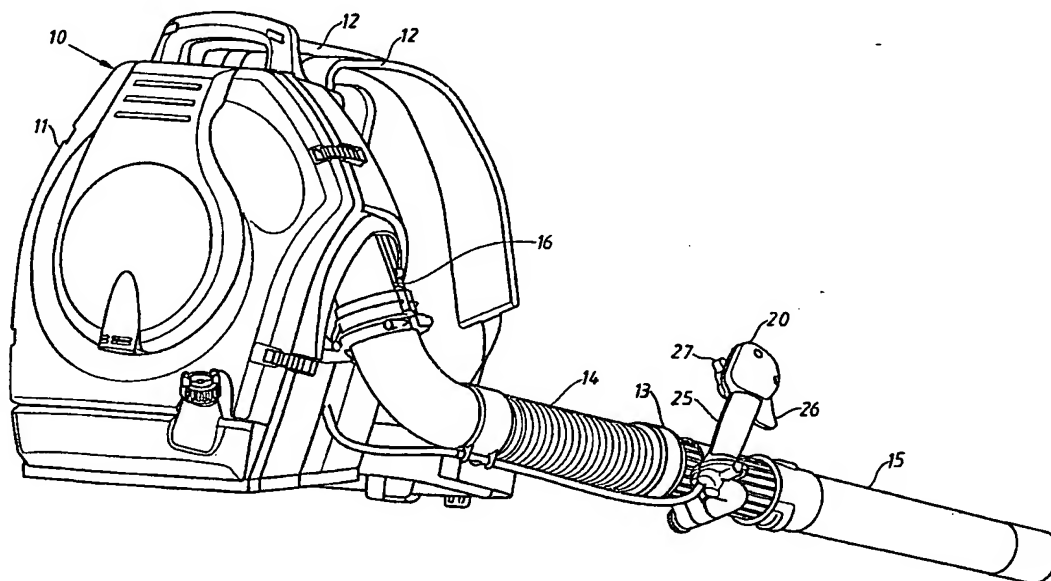
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **HANDLE ARRANGEMENT FOR A BLOWER**



(57) **Abstract:** Handle (20) or handles for a blower (10) carried on the back of an operator. The handle (10) or handles are placed on a stiff section (15) of a blower tube (13) extending from the blower (10). A longitudinal axle of the handle (20) or handles is placed outside the circumference of the stiff section (15) of the blower tube (13) when seen in a plane perpendicular to the longitudinal axle of the stiff section (15) of the blower tube (13). The projection of the longitudinal axle of the handle (20) in said plane is parallel to a straight line extending through the geometrical centre of the cross section of the stiff section (15) of the blower tube (13).

Title: Handle arrangement for a blower.

5 The claimed invention relates to a handle or handles for a blower carried on the back of an operator, said handle or handles are placed on a stiff section of a blower tube extending from the blower.

10 Engine powered blowers are frequently used for different kinds of outdoor work. The number of areas where blowers are used is increasing. In many areas are blowers replacing traditional brooms since a blower is an efficient and time saving tool for cleaning large areas such as parking places, pavements and lawns. The cleaning of, for example, a parking area with conventional equipment is difficult and time consuming because of parked cars and other obstacles on the parking place. If a blower is used is it possible to blow the rubbish from underneath or behind parked cars or obstacles, which increases efficiency and saves time as well as improves the final result.

15 Even though the blower is an efficient tool that facilitates the work of cleaning large areas, the operator normally works long shifts with the blower. There are two different types of blower, smaller ones that are hand held and larger models that are carried on the back of the operator in order to improve working conditions for the operator.

20 A blower carried on the back of the operator is supported by straps that extend over the shoulders of the operator. The blower is provided with a blower tube consisting of two sections, a first soft section secured to the fan outlet on the blower body on the back of the operator, and a second section that is a stiff pipe. The first soft section makes it possible to move the position of the stiff pipe. The blower tube extends from the fan outlet placed on one side of the blower on the back of the operator and forward to a position in front of the operator. On the blower tube is a handle secured to the tube so that the operator can control and steer the position of the end of the blower tube to in order to perform the work intended. The handle on blowers already existing on the market is placed on top of the blower tube somewhere along the blower tube and extending in a radial direction from the topside of the circumference of the blower tube.

Even though a blower facilitates work for the operator, his arms and hands are subjected to heavy loads due to the design of the handle. These loads must be reduced to improve

working conditions for an operator who is working long shifts with the tool. The claimed invention aims to reduce this problem.

5 The major part of the load that the operator is subjected to originates from a reaction force generated by the airflow in the blower tube. The air passing through the tube generates a reaction force acting in the opposite direction to the flow of the air.

Handles, which currently exist, are placed on top of the blower tube. This position results in a long distance between the centre of the handle and the centre of the tube.
10 The long distance in combination with the reaction force from the airflow generates a turning movement in the handle. The reaction force and the turning movement in the blower tube will affect the operator's hands in such a way that the operator will have to use a considerable force to compensate for the turning movement and the reaction force in order to control the blower tube.

15 The claimed invention reduces the problem defined by placing the handle so that a longitudinal axle of the handle or handles is placed outside the circumference of the blower tube when seen in a plane perpendicular to the longitudinal axle of the blower tube. The projection of the longitudinal axle of the handle in said plane is also parallel
20 to a straight line extending through the geometrical centre of the cross section of the blower tube.

This means that one side of the surface that is surrounding the handle will be placed towards the circumference of the stiff section of the blower tube. The handle is
25 preferably placed as close to the blower tube as possible but there must be enough space for the fingers on the operator's hand between the surface of the handle and the blower tube.

This position of the handle reduces the distance between the centre of the blower tube
30 and the centre of the handle. A shorter distance between the centre of the handle and the centre of the blower tube reduces the turning movement in the handle, and consequently the loads that the operator is subjected to. The distance between the surface of the handle where the operator holds his hand and the outer circumference of the blower tube is preferably between 15 to 60 millimetres. The distance is measured between the

point at the circumference of the blower tube and the surface of the handle that are placed at the shortest distance from each other. If the distance is bigger the reduction of the turning movement in the handle that the operator is subjected to will be reduced.

- 5 The blower tube is either provided with one single handle or a handle bar comprising two handles. If a handle bar is used, one handle is placed on one side of the blower tube and the other on the opposite side according to the claimed invention.

10 The handle or handles are movable around, and also along, the stiff section of the blower tube so that the operator is allowed to select a position of the handle or handles that is suitable for the operator, no matter of the physical dimensions of the operator. This improves working conditions for the operator considerably.

15 The handle or handle bar is attached to a curved arm secured to the blower tube by a loop surrounding the blower tube. The arm first extends in a perpendicular direction from the blower tube and is then curved towards the operator in order to reduce the distance from the operator to the handle or handle bar. The curved arm makes it possible to have a blower tube with a long flexible section without ending up with a handle or handle bar placed too far away from the operator's body. This improves the manoeuvrability of the blower tube.

25 The curved arm is allowed to turn in relation to the blower tube. This makes it possible to change the angle between the longitudinal axle of the handle and the longitudinal axle of the blower tube so that the operator can select the most comfortable position of the handle.

The handle or handles comprises one or more buttons or power regulating devices in order to regulate the power of the tool.

30 The cross section of the blower tube is normally a circle but other cross sections will also work. The handle is then placed so that the longitudinal axle is parallel to a straight line that extends through the geometrical centre of the cross section in use.

One embodiment of the claimed invention is illustrated in the drawings.

Figure 1. Illustrates a perspective view of a blower carried on the back of the operator.

5 Figure 2. Illustrates a perspective view of a handle and a section of the blower tube.

Figure 3. Illustrates a top view of the handle and blower tub section in figure 2.

Figure 4. Illustrates a cross section of the blower tube and the handle in figure 2.

10 In figure 1 is a blower 10 illustrated. The blower 10 comprises a blower body 11 containing for example an engine, a fan and related components. The blower body 11 is provided with two straps 12 that are placed around the shoulders of the operator to make it possible for the operator to carry the blower 10 on his back.

15 A blower tube 13 is extending from a fan outlet 16 on the right side of the blower body 11. The blower tube 13 consist of two different sections, a first flexible section 14 that makes it possible to move the blower tube 13 between different positions and a second stiff section 15. A handle 20 is secured to the blower tube to make it possible for the operator to manoeuvre the blower tube 13. The handle 20 is designed with a surface 25 for the hand of the operator surrounding the middle section of the handle 20. In the top
20 section of the handle are a throttle 26 and a stop button 27 placed to make it possible for the operator to control the blower 10.

In figure 2 is a part of the blower tube 13 and the handle 20 illustrated. The handle 20 is secured to the stiff section 15 of the blower tube 13 and used for control and
25 manoeuvring of the blower tube 13. The handle 20 is attached to a curved arm 21 secured to the blower tube 13 by a loop 22 surrounding the blower tube 13.

The loop 22 is fastened to the blower tube 13 by a screw 24 that is controlled by a wheel 23. When the screw 24 is released is the loop 22 released from the blower tube 13 so
30 that the position of the loop 22 and the handle 20 in accordance to the blower tube 13 could be changed. The position of the handle 20 and the loop 22 is then selected somewhere around the circumference of the blower tube 13. The handle 20 and the loop 22 are also movable along the stiff section 15 of the blower tube 13. The position of the handle 20 is selected by the operator to be comfortable and ergonomic.

When the screw 24 is released is the curved arm 21 allowed to turn in relation to the loop 22 and the longitudinal axle of the blower tube 13. This makes it possible to change the angle of the handle 20 in relation to the longitudinal axle of the blower tube 13 so that the operator can select the most comfortable angle of the handle 20.

In figure 3 is a topside view of the handle 20, the curved arm 21 and the blower tube illustrated. The curved arm 21 extends in transverse direction from the blower tube and the loop 22 while the outer end of the curved arm 21 is pointing in the opposite direction as the blower tube 13. The curved arm 21 makes it possible to have a longer flexible section 14 of the blower tube 13 without risking that the handle 20 will be positioned to far away from the operator.

In figure 4 is a cross section of the blower tub 13 illustrated. The longitudinal axle A of the handle 20 is substantially parallel to a straight line L extending through the geometrical centre of the cross section of the stiff section 15 of the blower tube 13. If the handle 20 is moved around the circumference of the blower tub 13 will the longitudinal axle A of the handle 20 still be parallel to a straight line L in the blower tube 13.

The handle 20 is placed on the side of the blower tube 13 with the surface 25 for the hand of the operator close to the circumference of the stiff section 15. The distance between the surface 25 on the handle 20 and the circumference of the blower tube 13 is kept as short as possible but there must be space enough for the fingers of the operator. The distance is normally between 15 to 60 millimetres.

Claims:

1. Handle (20) or handles for a blower (10) carried on the back of an operator, said
5 handle (10) or handles are placed on a stiff section (15) of a blower tube (13)
extending from the blower (10), **characterised in** that a longitudinal axle (A) of
the handle (20) or handles is placed outside the circumference of the stiff section
(15) of the blower tube (13) when seen in a plane perpendicular to the
longitudinal axle of the stiff section (15) of the blower tube (13), and that the
10 projection of the longitudinal axle (A) of the handle (20) in said plane is parallel
to a straight line (L) extending through the geometrical centre of the cross
section of the stiff section (15) of the blower tube (13).
2. Handle (20) according to claim 1, **characterised in** that the cross section of the
15 stiff section (15) of the blower tube (13) is a circle.
3. Handle according to claim 1 or 2, **characterised in** that the handle (20) or
handles are placed so that the distance from the outer side of the blower tube
(13) to a surface (25) on the handle where the operators hand is placed during
20 normal use of the tool not exceeds 100 millimetres.
4. Handle according to claim 3, **characterised in** that the distance is between 15 to
60 millimetres.
- 25 5. Handle according to claim 1, 2, 3 or 4, **characterised in** that the handle (20) or
handles is movable around the circumference of the blower tube (13).
6. Handle according to claim 1, 2, 3, 4 or 5, **characterised in** that the position of
the handle (20) or handles in axial direction along the tube (13) is adjustable.
30
7. Handle according to any of the previous claims, **characterised in** that the
blower tube (13) is provided with one handle (20) or a handle bar comprising
two handles.

8. Handle according to any of claim 1 to 7, **characterised in** that the handle (20) or handles are placed on a curved arm (21) so that the position of the handle (20) or handles are closer to the operator than the position where the curved arm (21) is secured to the blower tube (13).
- 5
9. Handle according to claim 8, **characterised in** that curved arm (21) is secured to the blower tube (13) by a loop (22) surrounding the blower tube (13).
10. Handle according to claim 9, **characterised in** that the loop (22) is secured to the blower tube (13) by a screw (24) activated by a wheel (23).
- 10
11. Handle according to claim 10, **characterised in** that the curved arm (21) and the handle (20) is turnable when the screw (24) is released so that the angle between the longitudinal axle (A) of the handle (20) in relation to the longitudinal axle of the blower tube (13) is changed.
- 15

1/4

FIG. 1

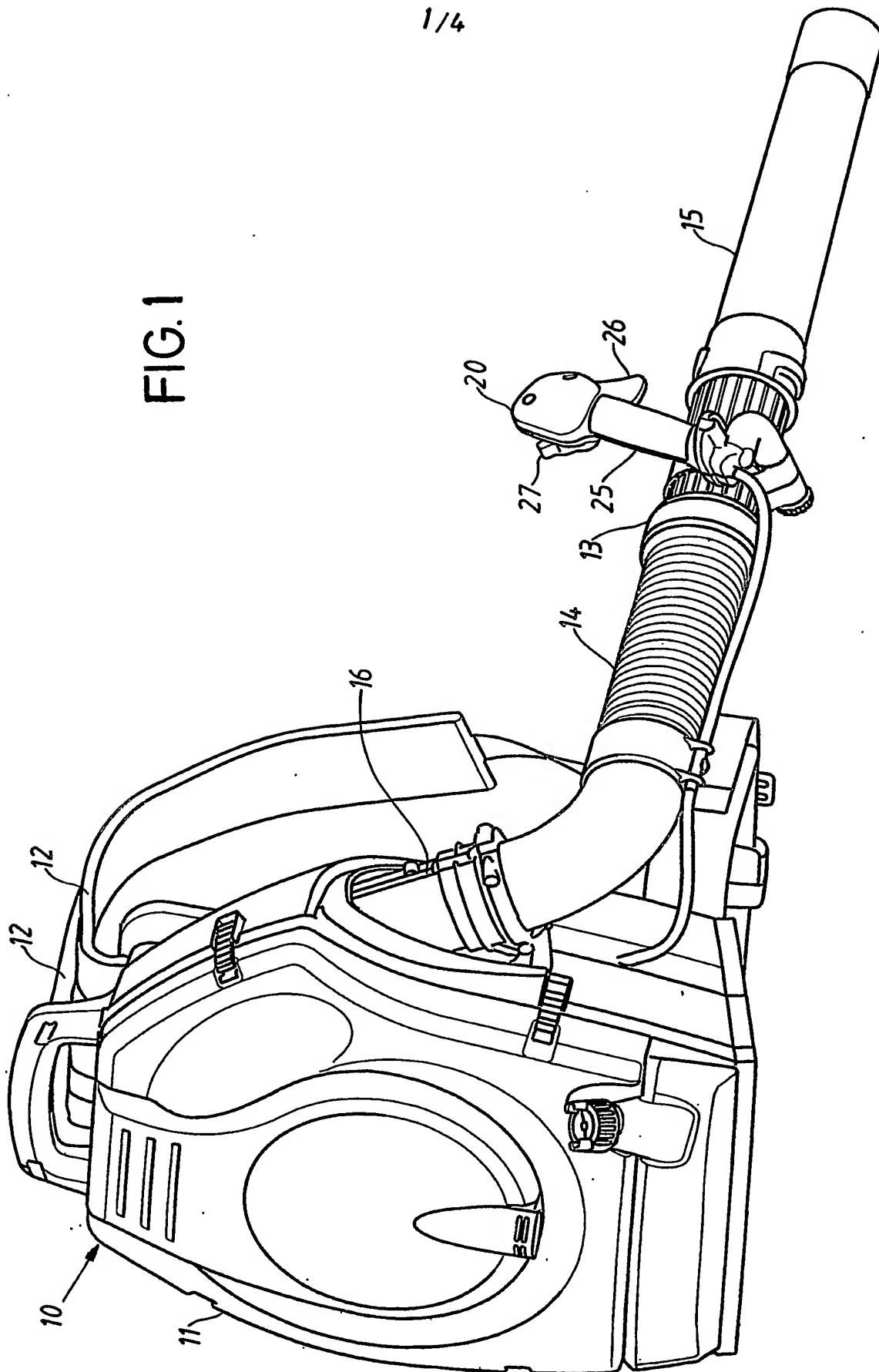
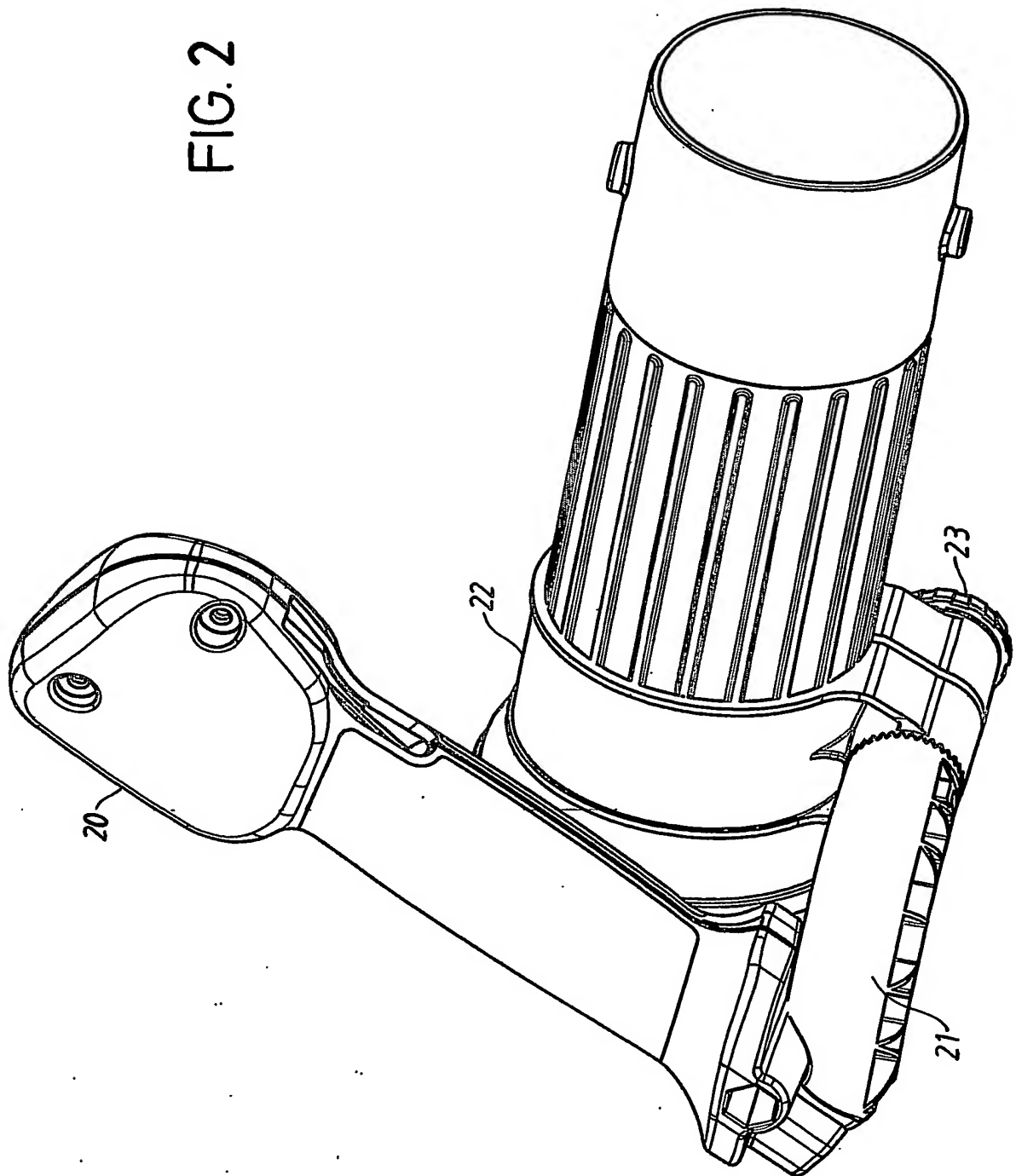


FIG. 2



3/4

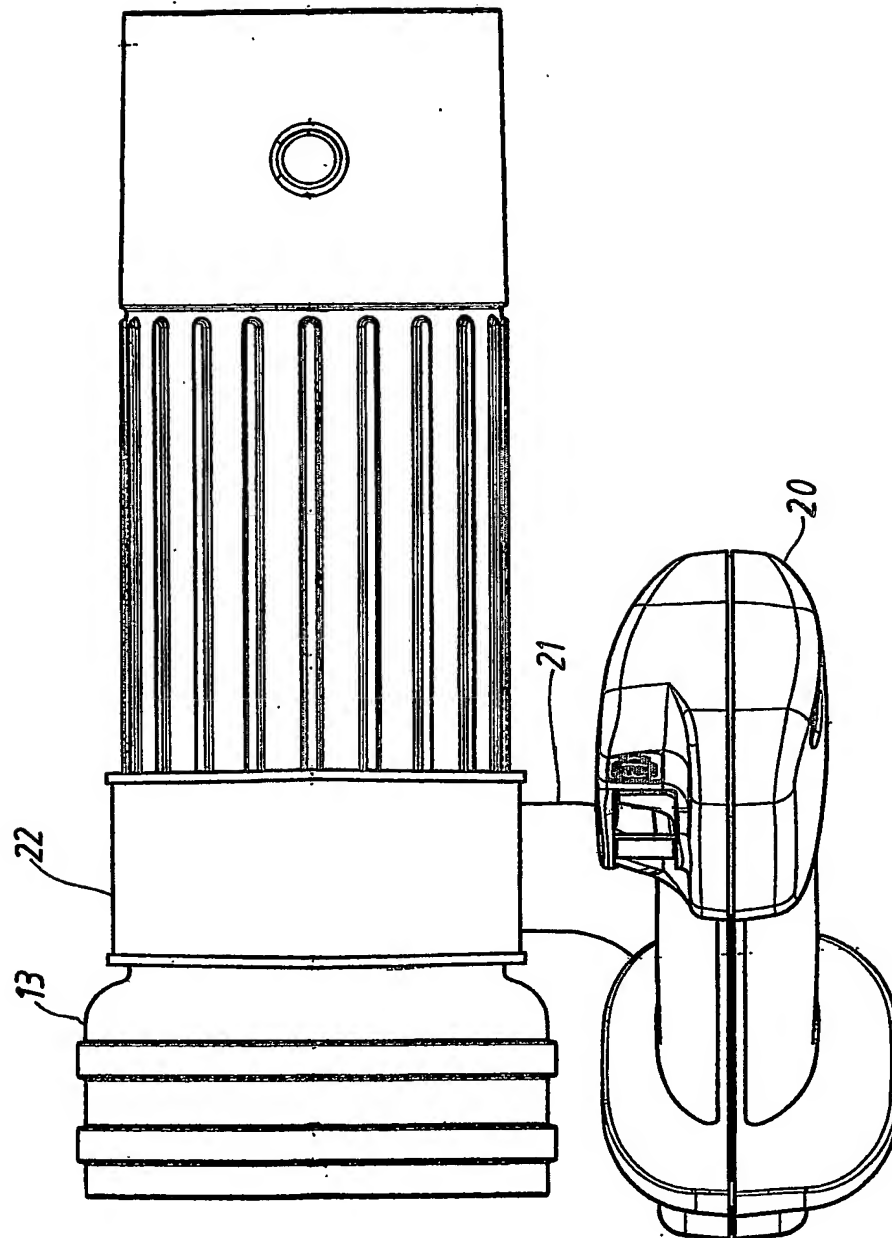


FIG. 3

4/4

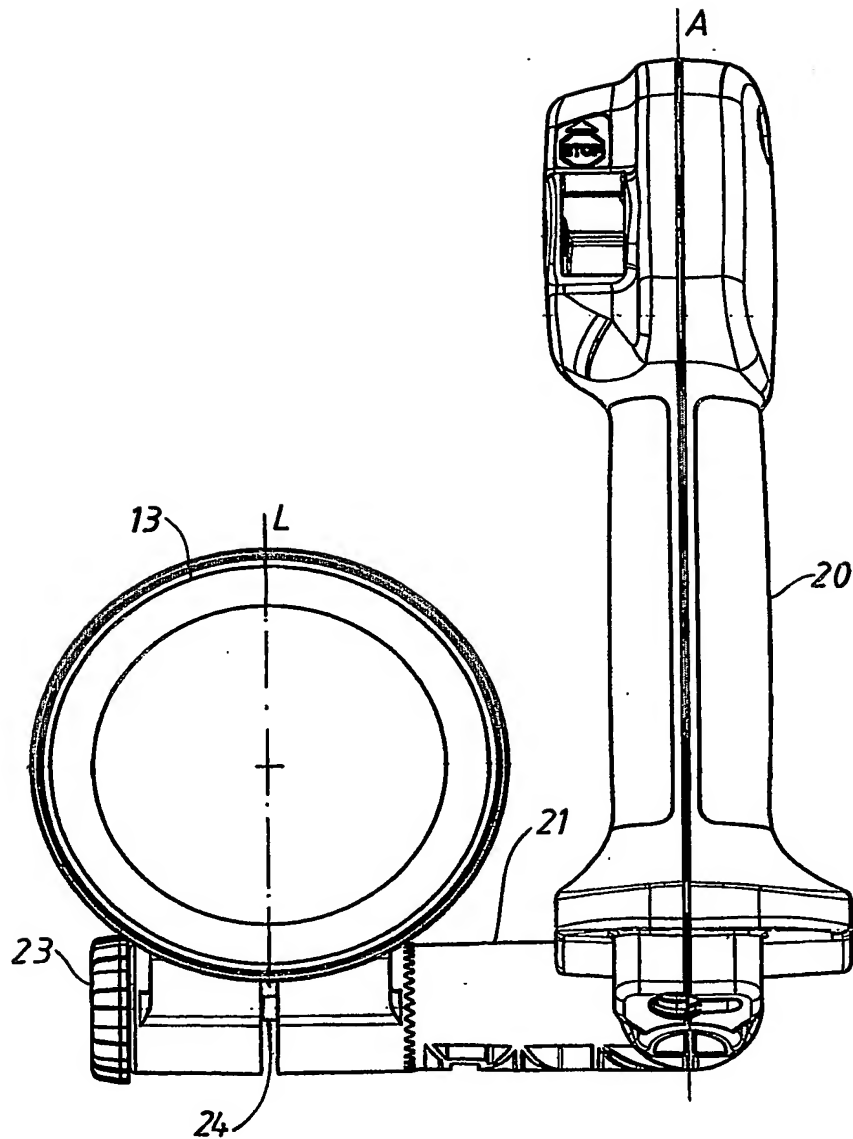


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2004/000157

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E01H 1/08, A47L 9/32, B25G 1/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E01H, A47L, B25G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5813088 A (J.F. WAGNER ET AL), 29 Sept 1998 (29.09.1998) --	1-11
A	US 6409097 B1 (W.H. MCCAULEY), 25 June 2002 (25.06.2002) --	1-11
A	US 2002174511 A1 (G. LIDA ET AL), 28 November 2002 (28.11.2002) --	1-11
A	US 2001005918 A1 (J. MIYAMOTO), 5 July 2001 (05.07.2001) --	1-11

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

5 April 2004

Date of mailing of the international search report

04 -05- 2004

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Jörgen Klöfver / MRo
Telephone No. +46 8 782 25 00

International application No.
PCT/SE 2004/000157

International application No.
PCT/SE 2004/000157

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 4413371 A (L.H. TUGGLE ET AL), 8 November 1983 (08.11.1983)</p> <p style="text-align: center;">-- -----</p>	1-11

INTERNATIONAL SEARCH REPORT

Information of patent family members

27/02/2004

International application No.

PCT/SE 2004/000157

US	5813088	A	29/09/1998	CA	2243747	A	23/01/1999
US	6409097	B1	25/06/2002	US	5947384	A	07/09/1999
				WO	9962643	A	09/12/1999
US	2002174511	A1	28/11/2002	JP	2002348824	A	04/12/2002
US	2001005918	A1	05/07/2001	JP	2001193697	A	17/07/2001
				US	6370729	B	16/04/2002
US	4413371	A	08/11/1983	NONE			